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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015**

COURSE NAME : ELECTRONICS I
COURSE CODE : BWC 10703
PROGRAMME : 1 BWC
EXAMINATION DATE : JUNE 2015 / JULY 2015
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

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- Q1** (a) Find the total impedance and phase angle for the circuit as in **Figure Q1 (a)**.
(4 Marks)
- (b) **Figure Q1 (b)** shows a RLC circuit supplied by an AC source, $V = 12\text{ V}$ and $f = 3\text{ KHz}$. Calculate,
- (i) equivalent impedance, Z_1 for C and L_2 .
 - (ii) equivalent impedance, Z_2 for R and L_1 .
 - (iii) total circuit impedance, Z .
- (16 Marks)
- Q2** (a) Describe the phenomenon of,
- (i) avalanche breakdown
 - (ii) zener breakdown
- (6 marks)
- (b) **Figure Q2 (b)** represent a power supply circuit which consists of transformer (5:1 ratio) and two rectifier diodes. Given the input of power supply is $100\text{ V}_{\text{RMS}}$. Identify;
- (i) total peak secondary voltage
 - (ii) peak inverse voltage (PIV) for each diode
 - (iii) voltage waveform across load resistor, R_L (draw).
- (8 marks)
- (c) List three differences of Bipolar Junction Transistor (BJT) and Field Effect Transistor (FET).
(6 marks)

- Q3** (a) List five applications of Junction Field Effect Transistor (JFET). (3 marks)
- (b) **Figure Q3 (b)** shows a common emitter (CE) amplifier circuit which consists of a transistor, resistors and capacitors (coupling and bypass) with given value and $\beta_{DC} = \beta_{AC} = 100$. Calculate,
- (i) base voltage, V_B
 - (ii) emitter current, I_E
 - (iii) internal emitter resistance, r_e
 - (iv) AC voltage gain, A_V
 - (v) total input resistance, $R_{in (tot)}$
 - (vi) source current, I_S
- (17 marks)
- Q4** (a) Determine the voltage gain for each common source, CS FET amplifier in **Figure Q4 (a)(i)** and **Figure Q4 (a)(ii)**. (8 marks)
- (b) The differential amplifier circuit in **Figure Q4 (b)** consists of two transistors and supplied by ± 15 V. Given that transistor 1, T_1 has an $\alpha = 0.98$ and transistor 2, T_2 has an $\alpha = 0.975$. By using transistor knowledge, determine the dc differential output voltage. (20 marks)
- Q5** (a) State three characteristics of ideal op-amp and three characteristics of practical op-amp. (6 marks)
- (b) Describe op-amp parameters below.
- (i) Slew Rate (SR)
 - (ii) Common Mode Rejection Ratio (CMRR)
- (4 marks)

- (c) **Figure Q5 (c)** shows a practical differentiator circuit with a triangle input waveform of 5 V. Determine,
- (i) time constant
 - (ii) output voltage during the rising input and negative going ramp.
 - (iii) draw the output waveform.

(10 marks)

- END OF QUESTION -

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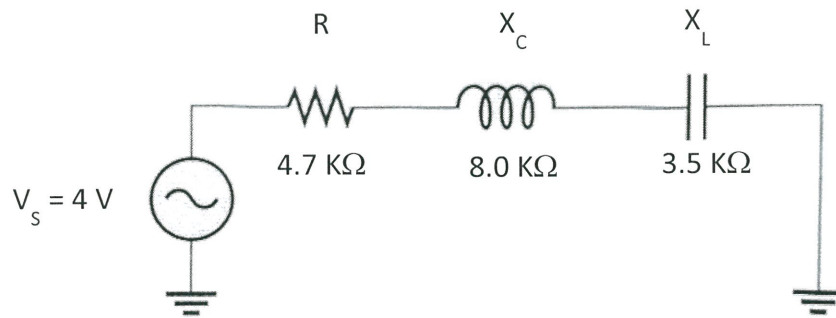


FIGURE Q1(a)

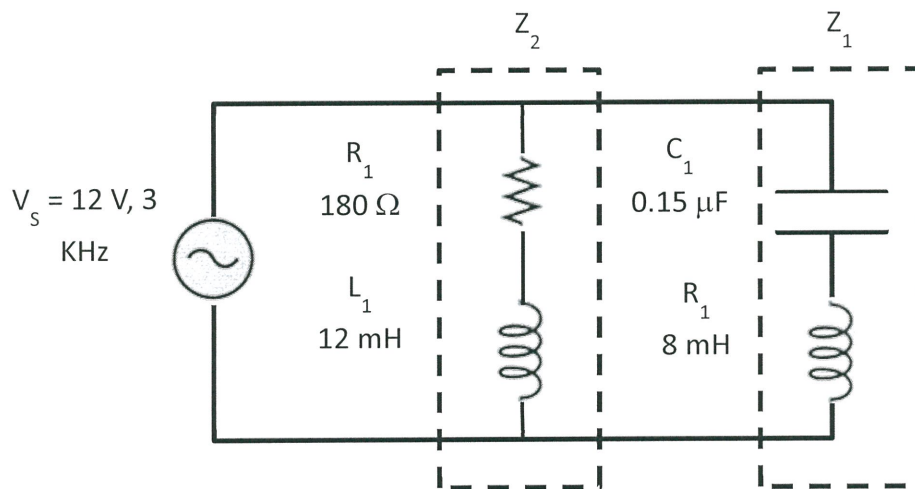


FIGURE Q1 (b)

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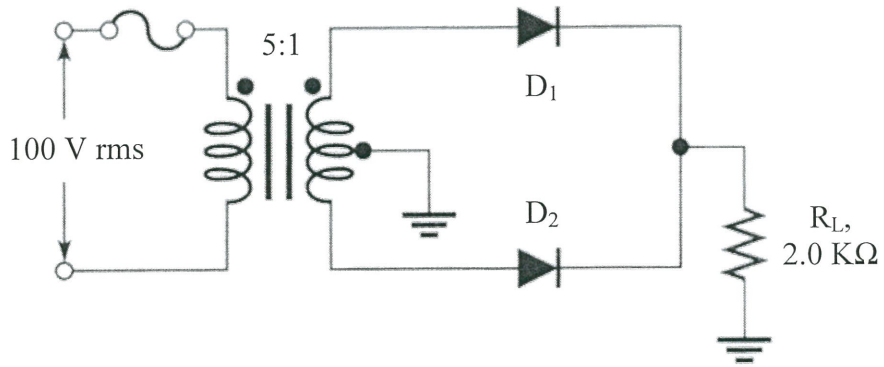


FIGURE Q2 (b)

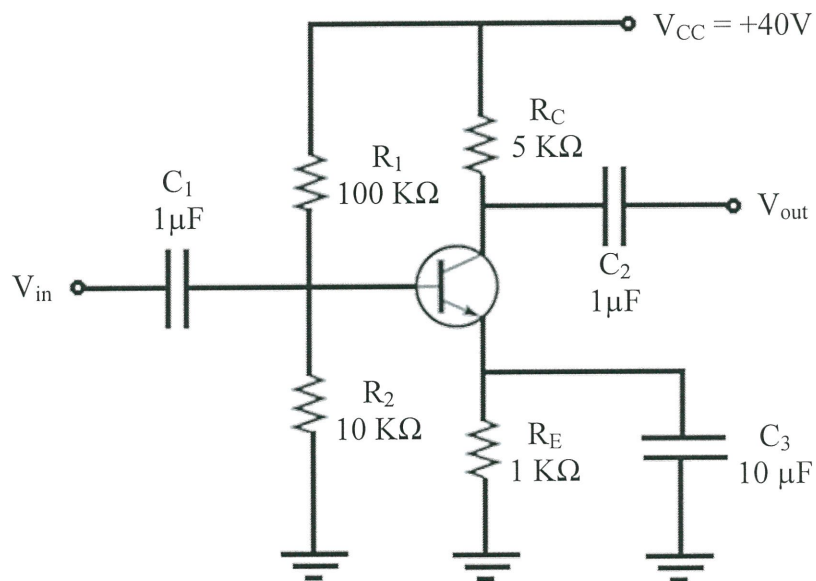


FIGURE Q3 (b)

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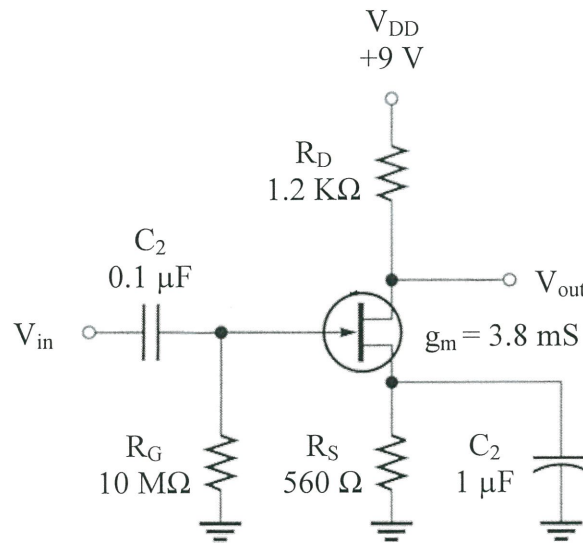


FIGURE Q4 (a)(i)

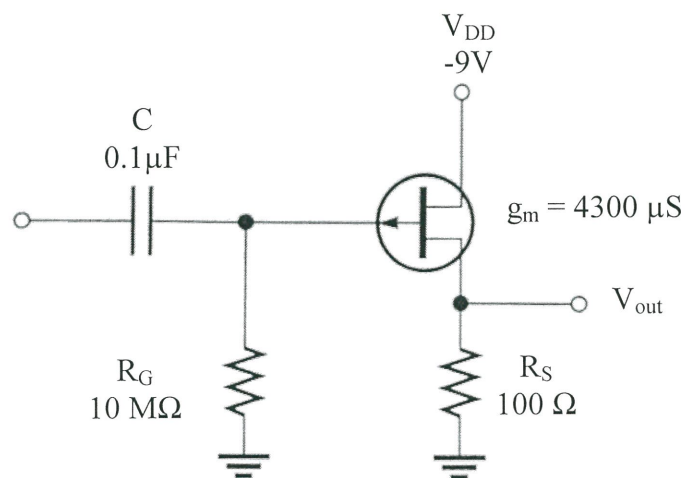


FIGURE Q4 (a)(ii)

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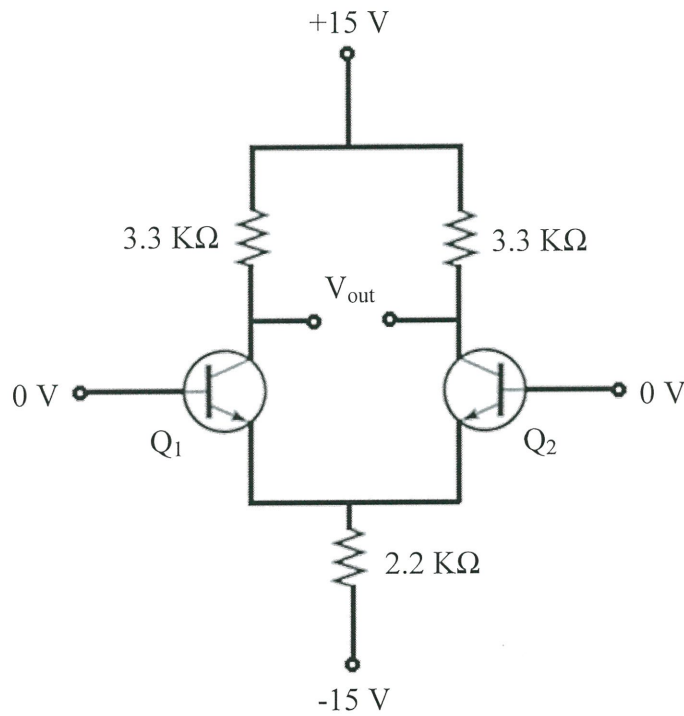


FIGURE Q4 (b)

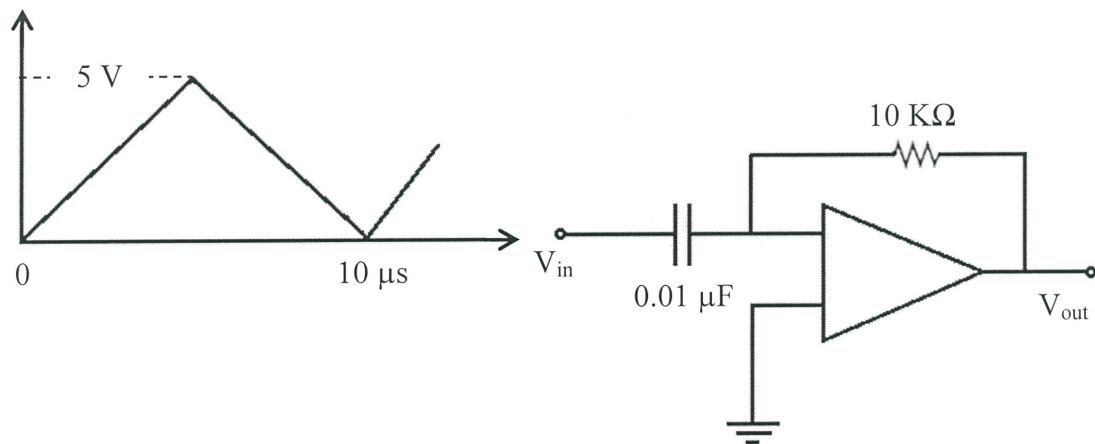


FIGURE Q5 (c)